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TECHNICAL MINUTE NO. 65

EXPERIMENTAL STATION
SUFFIELD ALBERTA

22 Jun 44

THE PROTECTION AFFORDED AGAINST MUSTARD GAS VAPOUR

BY CC2 IMPREGNATED (AQUEOUS METHOD) KHAKI DRILL TROUSERS

Reference: C.W.L. S-5-6-0, dated 24 Apr 44.
0-1-0
FES S-28-1-8(B.4313) dated 26 May 44.
Suffield Technical Minute #58.

Introduction.

1. In previous trials carried out with A.V. impregnated K.D. shirts and trousers (reported in Suffield Technical Minute 58) it was found that the trousers were satisfactory, but that owing to leakages at the wrists and at the front closures, the shirts were not. Trials with CC2 impregnated clothing are, therefore, being confined to K.D. trousers until modified shirts are available.

Object:

2. The trial recorded herein was designed to test the protection afforded by CC2 impregnated (aqueous method) unmodified K.D. trousers against mustard gas vapour under hot, humid conditions. These garments were impregnated in Ottawa. The available chlorine content of the material varied from 1.69 to 3.72 mg/sq.in.

PROCEDURE

3. A total of six men were employed in each test. They were dressed in the following clothing:

(a) CC2 impregnated U.S. tunics.

(b) K.D. trousers, CC2 impregnated (aqueous method).

(c) Anklets, socks and boots (non-impregnated).

(d) Respirators, general service, at the gas position.

(e) Helmets, general service.

Neither underwear not anti-gas hood was worn, and any loosely fitting tunic necks were snug-fitted with tape. Ointment, A.G.No.5 was applied to all uncovered skin surfaces.

4. As controls, two caged rabbits were exposed simultaneously with the men.

5. The men were exposed in a gas chamber of 10 cu.m. capacity in in which known C.T.'s of mustard gas vapour were achieved by evaporation of pure mustard gas on an electric hot plate. Climatic conditions in the chamber were maintained at 99-103° F. with a relative humidity of 85-88 per cent. The air in the chamber was thoroughly mixed by means of electric fans.

6. In order to achieve maximum "billows" effect of the garments, the men moved about every five minutes and performed deep knee-bends and static running movements for 1 to 2 minutes.

7. After exposure the garments were worn for a period of four hours. The first hour was spent in a quiescent state in a room heated to 100-102°F. with a relative humidity of 65%. The ensuing three hours were spent at a room temperature of approximately 70°F.

8. Vapour sampling during exposure was carried out by injector operated bubblers (two in series) at a flow rate of 10.1/min. Duplicate samples were obtained every ten minutes through a pipe in one wall of the chamber at a height of 30 inches.

9. The sampling times were:

(a) Z to Z plus 10 minutes.

(b) Z plus 10 to z plus 20 minutes.

(c) Z plus 20 to Z plus 30 minutes.

10. Analyses of samples were carried out using both the bromine and the iodoplatinate methods.

RESULTS

11. The results obtained are listed below in Table I.

TABLE I.

TRIAL No.1	SAMPLING TIME	mgm/m³	Exposure time	CT	Temp.	R.H.	RESULTS Human Observers	RESULTS Rabbits.
	z to z+10	1 2 20.5 15	27 Min.	470	98°F	88%	No lesions apparent in 7 days.	2/2 showed corneal clouding, conjunctival and lid oedema in 24 hours. 2/2 had both eyes closed by oedema; a plastic exudate covered the corneas. A nasal discharge was was present in both rabbits.
	z+10 to z+20	24.5 19						
	z+20 to z+26	11.5 11.5						
TRIAL No.2	z to z+10	2 86	30 Min.	780	99°F.	85%	6/6 showed neck & ear erythema in 24 hours, progressing to neck vesiculation in two instances. 6/6 developed pigmentation of the neck. 3/6 developed erythema and scrotal irritations progressing to incrustations in two instances.on the seventh day. 3/6 developed scalp incrustations.	2/2 rabbits showed conjunctivitis, corneal hazing and discharge at 24 hrs. 2/2 rabbits dead by 72 hrs.
	z+10 to z+20	23 24.5						
	z+20 to z+30	22.5 25						